

Willow Creek Subbasin Assessment and TMDLs



Department of Environmental Quality

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3. Subbasin Assessment – Pollutant Source Inventory

The primary source of sediment input to water quality impaired streams within the Willow Creek watershed is streambank erosion. Potential sources of sediment pollution can include roads built too close to streams or improperly maintained, erosion from cultivated fields, mass wasting or landslides related to improper engineering techniques, and urban runoff. Streambank erosion is often significantly greater than these potential sources in the long term.

Sediment from streambank erosion is delivered directly to the stream channel without attenuation or deposition, as is often the case with natural hillslope erosion. Depositional features that result from streambank erosion often further accelerate erosion by redirecting flow into formerly stable banks. Eventually streambank stability is greatly reduced.

As streambanks erode, the width of the stream increases, so that riparian vegetation and the shade provided by the vegetation decreases. This reduction in shade further decrease the stability of streambanks and increase the thermal load to the stream, which is another important pollutant related to streambank stability. This type of pollution occurs over a wide area and is considered nonpoint source pollution.

3.1 Sources of Pollutants of Concern

Point Sources

There are no Superfund or RCRA sites in the Willow Creek Subbasin. There are no national pollution discharge elimination system (NPDES) permitted point sources, nor are there any potentially unpermitted point sources in this area. Since there are no known point sources, no waste load allocations (WLA) will be developed for point sources.

Nonpoint Sources

The primary source of nonpoint source pollution to streams in the Willow Creek Subbasin is sediment from streambank erosion, and the primary cause of streambank erosion is alteration of stabilizing vegetation on streambanks that results in unstable streambanks. As streambank erosion progresses, depositional features form in the channel that redirect current and further reduce bank stability. This process continues until the stream forms a new flood plain and deposition forms new streambanks that become colonized with stabilizing vegetation. This process can take many years to play out once channel alteration begins.

Land use, as previously discussed, is primarily agricultural adjacent to streams impaired by temperature and sediment. The agricultural use that has the greatest effect on streambank stability is grazing. Grazing occurs throughout the subbasin in riparian areas.

Other sources of nonpoint source sediment pollution can include roads and erosion from cultivated fields.

Pollutant Transport

Pollutant transport related to sediment is primarily a function of particle size, channel type, channel width and channel gradient. Affected streams in the Willow Creek watershed are primarily low gradient C channels with elevated fine particle composition above 6.35mm. Small particles of sediment are transported is farther, the higher the stream power the greater the transport capability.

Streambank erosion, road erosion, and mass wasting are the three principal sources of sediment loading in the subbasin, and erosion from these sources peaks during spring runoff and occasional high precipitation events.